

# Open-End Series Coalescer Cartridges Installation Instruction

1. Turn off the pump. Close inlet and outlet valves to the filter.
2. Open the air eliminator or manual air vent valve and drain the vessel through the bottom drain. Also drain a few gallons out of the inlet compartment "dirty" drain.
3. Loosen the bolts and swing the cover back.
4. Remove the spider (if installed) and then remove the old cartridges from the vessel.
5. Cut the new cartridges' protective poly-bags at both ends.
6. Holding the new cartridge with the poly-bag still protecting the cartridge, place it over the tie rod. (The poly-bag protects the cartridge from being disarmed by handling.) Make sure the cartridge seats against the mounting adapter. **DO NOT TOUCH THE OUTER SOCK.**
7. Remove the poly-bag **SLOWLY** from the cartridge after it is properly seated.
8. If open-end cartridges are stacked, insert a center spacer over the tie rod and seat it on the cartridge just installed. Install next cartridge over the spacer as per step 6. Be sure cartridge is properly seated.
9. Place the end seal plate over the rod and seat onto top of cartridge.
10. Place the rubber gasket, flat washer, lock washer, and nut on the rod and tighten down hand tight. (Use the new rubber gasket in the plastic bag supplied with the cartridge.)
11. Torque the nut to 5 ft-lbs. of torque (or until the rubber gasket starts to spread and curl up). Repeat steps 5-11 until all cartridges are installed.
12. If supplied, install the spider plate over the ends of the cartridges. Before tightening bolts ensure proper spacing between the cartridges. Cartridges should not touch each other or the vessel wall. The

ends of the cartridges can be shifted within the spider plates holes as follows:

Cartridge Length	Shift Within the Spider Hole
Greater than 33"	Full movement within the spider hole
30"	Less than 5/8" (16 mm)
28"	Less than 9/16" (14 mm)
24"	Less than 1/2" (12 mm)
22"	Less than 1/2" (12 mm)
20"	Less than 3/8" (10 mm)
18"	Less than 3/8" (10 mm)
16"	Less than 5/16" (8 mm)
14"	Less than 1/4" (6 mm)
11"	Less than 3/16" (5 mm)
9"	Less than 3/16" (5 mm)

13. Adjust the spider clip nuts, so the spider lies flat on the ends of the cartridges. When the cartridges are properly spaced, tighten the spider nuts to 5 ft-lbs.
14. Making sure no poly-bags remain in the vessel, replace cover and tighten securely. Follow procedures listed on Bulletin 1935, on back of this form.
15. Close the bottom drain valve and start the system pump.
16. Open the inlet valve slightly. Keep the outlet valve closed.
17. Allow the filter to fill **SLOWLY** with the fuel until the air eliminator closes. If a manual air vent is on the unit, allow to fill **SLOWLY** until fuel comes out of vent valve, then close the vent valve.
18. When vessel is full, open the inlet valve fully, then slowly open the outlet valve.
19. While the unit is operating, check the pressure drop across the elements. There should be some indication of a positive pressure, normally 1-5 psid. This insures that all seals have been properly made during the installation. of positive pressure, normally 1-5 psid. This insures that all seals have been properly made during the installation.

## OPERATING PROCEDURES

Parker AFD Recommended Cartridge Changeout  
(Also refer to your company guidelines)

Coalescer Cartridges: 1 year or 15 psid, whichever occurs first

# TORQUE REQUIREMENTS FOR VESSELS WITH “O-RING CLOSURE”

Bolted pressure vessel closures operate on the premise that the joint is clamped closed with a force sufficient to resist the internal pressure yet still maintain a seal. The clamping force, or pre-load, is applied by the closure bolts and its magnitude is controlled by the torque applied. Application of the correct preload is essential to maintaining a positive seal and avoiding closure failures from fatigue or overstressed vessel components.

The short term, and most obvious effect of grossly under-torqued bolts is insufficient clamping force resulting in a leaking closure. A more ominous result of under-torqued bolts in systems which see a great number of pressure cycles (such as refuelers, loading racks etc.), is bolt fatigue failure. Repeated applications of stress to the bolt eventually create a small crack at the surface of the bolt which continues to grow until the bolt breaks and the closure fails.

It is a good idea to re-torque the closure bolts after they have been in use for a month or so to ensure the joint has not “relaxed” and the preload reduced.

Over-torquing closure bolts will result in breaking or bending vessel bolt clips or actually breaking the bolt itself. Table One lists guideline torque values for lubricated bolts for common sizes used for vessel closures. Always use lubricated bolts, as this reduces the required torque, improves torque accuracy, and retards corrosion.

A common cause of inaccurate bolt torque is inappropriate bolt torquing procedures. Key elements to the procedure are application of the torque in stages and in a specific cross-torquing sequence. For most applications, torque is applied to all bolts to 30% of full torque, then to all bolts to 60% of full torque, and finally to all bolts to 100% of full torque. Each torquing cycle is carried out in the applicable cross-torquing sequence. Torquing sequences vary with the number of bolts on the cover.

The tightening pattern is as follows: Tighten two bolts diametrically opposite from each other, then tighten a second pair of bolts diametrically opposite each other, approximately 90 degrees away from the first pair, and so on until all bolts have been tightened.

Using a clock as an example, the sequence would be: 12, 6, 9, 3, 11, 5, 10, 4, 7, 1, 8, 2.

On large vessels, the cross-torquing process is tedious but the addition of a second operator applying torque improves the situation vastly.

Correct closure torquing will result in many years of trouble-free vessel operation. Occasional inspections for bolt cracks or clip damage is good practice to detect possible closure problems before they occur. More detailed or specific information on bolt torquing requirements and procedures can be obtained by calling +1 719 531 5855.

TABLE ONE*	
Bolt Diameter mm (in.)	Recommended Torque m-kgs (ft-lb)
13 (1/2)	3 (20)
19 (3/4)	6 (45)
25 (1)	14 (100)
32 (1-1/4)	22 (160)
38 (1-1/2)	36 (260)

\*NOTE: These recommended torque values are only for vessels with an O-Ring closure.